REMARKS

The Office Action dated April 17, 2007 has been received and carefully considered. In this response, no amendment is made. Reconsideration of the outstanding rejections in the present application is also respectfully requested based on the following remarks.

I. THE ENABLEMENT REJECTION OF CLAIMS 1-29

On pages 2-3 of the Office Action, claims 1-29 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. This rejection is hereby respectfully traversed.

Regarding claims 1-13, 26 and 27, the Examiner asserts that the limitation "[*storing backup data that correspond to a continuous period of time*] *uninterrupted by any pre-existing volume-level snapshot of the plurality of units of storage*" is not supported by the written description of the original disclosure. Applicants respectfully disagree.

Although there might be no literal description in the original disclosure, this limitation was inherently disclosed at the time of filing the present application. As stated in MPEP

§2163.02, the fundamental factual inquiry is whether a claim defines an invention that is clearly conveyed to those skilled in the art at the time the application was filed. The subject matter of the claim need not be described literally (i.e., using the same terms or in *haec verba*) in order for the disclosure to satisfy the description requirement. Also, as stated in MPEP §2163.07(a), by disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory, or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The patent application may later be amended to recite the function, theory, or advantage without introducing prohibited new matter. In re Reynolds, 443 F.2d 384, 170 USPQ 94 (CCPA 1971), In re Smythe, 480 F. 2d 1376, 178 USPQ 279 (CCPA 1973).

In both the "Background of the Invention" and the "Detailed Description" sections, Applicants inherently disclosed the limitation "*storing backup data that correspond to a continuous period of time uninterrupted by any pre-existing volume-level snapshot of the plurality of units of storage*" as presently claimed.

For example, in paragraph [0008], Applicants criticized snapshot creation as being "inefficient and costly because it

increases the storage capacity required to backup the data storage device at multiple points in time." This is because, in the snapshot approach, "each unit of storage is saved regardless of whether the data stored in it is unchanged since the time that the previous backup was made." Further, in paragraph [0009], Applicants criticized the snapshot technology as being ineffective because "snapshots are created at the then current point in time either in conjunction with the users [sic] request or as a result of a previously scheduled instruction to create a snapshot of the stored data" and therefore do not "allow the user to employ hindsight to recreate a data set that was current at some past time."

In the "Detailed Description" section, Applicants referred to "snapshot" in only two instances. In paragraph [0097], a time image in accordance with the present invention was compared to a traditional snapshot. A time image is "an image that may not have previously existed at any time since the recovery time." "In contrast, a snapshot is a duplicate that is generated at the then current time." In paragraph [0067], the word "snapshot" appeared in the following sentence (emphasis added):

> The storage management device 38 thus can present a continuum of "prior images" of a data store to the host 34 regardless of whether a snapshot was generated prior to

> the request time where each prior image is a view of the disk at the recovery time.

This sentence, together with the lack of reference to snapshot creation in data backup processes, clearly conveys the fact that the present invention does not rely on snapshots at all. In fact, pre-scheduled creation of volume-level snapshots would be unnecessary and wasteful in the context of the present invention. Reading the original disclosure, a person of ordinary skill in the art of data storage would appreciate that the present invention has completely broken away from the traditional mentality of snapshot creation. Unlike the Wu reference (as discussed below), the present invention no longer requires snapshots in data backup or restoration.

Regarding claims 1-29, the Examiner asserts that the limitation "*identify historic data that were present in a specified portion of the plurality of units of storage at any point during the continuous period of time*" would require the invention to teach a measurement mechanism that provides infinite precision to pinpoint the precise time within a time interval. Applicants respectfully disagree.

The phrase "*at any point during the continuous period of time*" shows a capability of the claimed invention to identify historic data present at a past time, wherein the past time can be specified to be any point within a continuous time interval

and need not be a pre-scheduled point in time. In other words, since "the storage management system automatically intercepts all write commands issued to the plurality of units of storage" during a continuous period of time, the storage management system is able to recover the status of a storage unit based on the recorded write commands.

The step of intercepting all write commands requires no time measurement of infinite precision - each write command capable of affecting the storage units can no doubt be intercepted or captured by the storage management system. Such write commands are "meaningful changes" as understood in the art, and it is also generally understood that any subsequent data restoration is with respect to those "meaningful changes" based on current technological capabilities.

The step of restoring or identifying historic data requires no time measurement of infinite precision, either. The claim language indicates that a user can specify any point within the continuous time interval and the historic data existing at that point can be restored. The restoration refers to the "status" of storage units at a past time, not any infinitesimal changes actually occurring at that point in time. (If a storage unit was still being written at that point, its status has not changed yet.) No matter how precise the user specifies this

past time, the copy-on-write records accumulated up to that point can facilitate restoration of historic data to that point in time. For example, the user may very well specify a point in time such as 12:44:57.00000000001. However, if no write command was recorded since 12:44:55, the status of a storage unit at 12:44:57.00000000001 would the same as 12:44:55. If a next write command occurs at 12:45:08, then at any point between 12:44:55 and 12:45:08, be it 12:44:59.999999999999 or 12:45:01.33333333333333, the status of the storage unit remains the same as when the last write command was executed at storage unit (i.e., at 12:44:55). The Examiner is also referred to paragraph [0067] (also quoted above at pages 4-5) where Applicants described the ability of the storage management system 38 to present "a continuum of "prior images" of a data store."

Therefore, claims 1-29 do not require any measurement mechanism that provides infinite precision.

In view of the foregoing, it is respectfully requested that the aforementioned enablement rejection of claims 1-29 be withdrawn.

II. THE ANTICIPATION REJECTION OF CLAIMS 1-10, 13-15, AND 21-29

On page 4 of the Office Action, claims 1-10, 13-15, and 21-29 were rejected under 35 U.S.C. § 102(e) as being anticipated

by Wu et al. (U.S. Patent No. 6,981,114, hereinafter "Wu"). This rejection is hereby respectfully traversed.

This ground of rejection is essentially the same as in the October 23, 2006 Office Action. Applicants maintain and summarize the previous arguments against Wu as follows.

(1) Wu relies on volume-level snapshots and has not disclosed or even suggested a data protection technique, as presently claimed, that can dispense with volume-level snapshots. In Wu, a modification log is created with necessary reference to two consecutive volume-level snapshots.

(2) Wu's modification log is created for the limited purpose of reconstructing a previously created but currently deleted volume-level snapshot. Wu does not teach or suggest the use of backup data to restore any portion of a data store to any point in time.

Since Wu does not teach or suggest all the elements as claimed, claims 1, 14, 21, and 23 and their dependent claims are allowable over Wu.

The Examiner's rejection of the newly added limitations does not resolve Wu's deficiencies as discussed in Applicants' previous response. The Examiner has only responded to Applicants' remarks on common ownership in the context of obviousness rejection of claims 11, 12, and 16-20. However, the

Examiner has not responded to Applicants' substantive arguments, as summarized above, in the context of either anticipation or obviousness rejections. Contrary to the Examiner's assertion, Applicants' earlier arguments with respect to claims 1-29 have not become moot. Apart from considering the newly added limitations, the Examiner has not presented new ground(s) of anticipation or obviousness rejections in the April 17, 2007 Final Office Action.

Therefore, not only is the claimed invention allowable over Wu, the finality of the claim rejections is also improper.

In view of the foregoing, it is respectfully requested that the aforementioned anticipation rejection of claims 1-10, 13-15, and 21-29 be withdrawn.

III. THE OBVIOUSNESS REJECTION OF CLAIMS 11, 12, AND 16-20

On page 9 of the Office Action, claims 11, 12 and 16-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu in view of "UNIX In A Nutshell" by Daniel Gilly and the staff of O'Reilly & Associates, Inc. (hereinafter "Gilly").

It is believed that these obviousness rejections have become moot in view of the deficiencies of the primary reference Wu as discussed above. Since Gilly does not teach or suggest the claim element that Wu fails to disclose, the combination of Wu with Gilly cannot render any of the pending claims obvious.

In view of the foregoing, it is respectfully requested that the aforementioned obviousness rejection of claims 11, 12 and 16-20 be withdrawn.

IV. CONCLUSION

In view of the foregoing, it is respectfully submitted that the present application is in condition for allowance, and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed telephone number, in order to expedite resolution of any issues and to expedite passage of the present application to issue, if any comments, questions, or suggestions arise in connection with the present application.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0206, and please credit any excess fees to the same deposit account.

Respectfully submitted,

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